

Owner's Manual

Model Numbers:

TS-720 E-Z TILLER

Date 09-12-01

Supplier To The Outdoor Power Equipment IndustryISM, Inc. • 1028 4th Street SW • Auburn, WA 98001 • Phone: (253) 333-1200 • Fax: (253) 333-1212



Dear E-Z Tiller[™] Owner-

We congratulate you for choosing the finest and most "use-friendly" tiller in its class. Rugged and easy-to-operate, your Excel E-Z Tiller is the only small, gas-powered tiller in the world with an electric starting system. So whether you're tilling soil or edging the lawn, weeding flowerbeds or de-thatching grass, E-Z Tiller makes it simple to maintain your lawn and garden. It's easily the most versatile outdoor power tool you can own.

Your Excel E-Z Tiller is superbly engineered and painstakingly assembled, which means it will provide many years of dependable service. Its sturdy 2-cycle engine is built by one of the most highly regarded engine manufacturers in the world, with over 65 years of experience. These power plants have a reputation for reliable performance and long life. You're guaranteed trouble-free operation for years to come.

We suggest that you become thoroughly acquainted with your new E-Z Tiller before using it. Please take the time to read this manual, and observe its recommendations. Knowing what the E-Z Tiller can do, and how to operate it safely, you'll derive far greater enjoyment from using it. Welcome to the world of effortless lawn and garden maintenance!

This symbol of safety will be found throughout the manual, alerting you to a potentially dangerous situation. Carefully read each message that follows the safety symbol.

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Safety Precautions

NOTE: These instructions are for your protection. Please read them carefully.

Training

Before using your E-Z Tiller for the first time, read the entire Owner's Manual carefully. It is important to be thoroughly familiar with the controls and the proper use of the equipment.

Never allow children to operate the equipment. Don't let friends or neighbors use your E-Z Tiller without proper instruction.

Keep the area of operation clear of all persons, particularly small children, and pets.

Preparation

Thoroughly inspect the area where the equipment is to be used and remove all foreign objects.

Do not operate the equipment without wearing adequate outer garments. Wear footwear which will improve footing on slippery surfaces.

Handle fuel with care; it is highly flammable.

- a) Use an approved fuel container.
- b) Never add fuel to a running or hot engine.
- c) Never fill fuel tank indoors.
- d) Replace gasoline cap securely and clean up spilled fuel before restarting.

Never attempt to make any adjustments while the engine is running (except where specifically recommended in this manual.)

Operation

- 1. Keep hands and feet away from rotating tines.
- 2. Use extreme caution when operating on or crossing gravel drives, walks, roads.
- 3. If you should strike a foreign object, stop the engine. Disconnect the spark plug wire, and keep the wire away from the plug to prevent accidental starting. Thoroughly inspect the tiller for any damage, and repair the damage before restarting and operating the tiller.
- 4. Exercise caution to avoid slipping or falling.
- 5. If the unit should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.
- 6. Stop the engine whenever you leave the operating position. Also disconnect spark plug wire before unclogging the tmes and when making any repairs, adjustments, and inspections.
- 7. Take all possible precautions whenever you leave the machine unattended. Always stop the engine. Never leave engine unattended while running.
- 8. Before cleaning, repairing, or inspecting, shut off the engine and make certain all moving parts have stopped.
- 9. NEVER run engine indoors. Exhaust fumes contain CARBON MONOXIDE which is an ODORLESS and DEADLY POISONOUS GAS.
- 10. Never operate the tiller without proper guards, plates, or other safety protective devices in place.
- 11. Keep children and pets away from the tiller while it is running.
- 12. Do not overload the machine's capacity by attempting to till too deep at too fast a rate.
- 13. Never allow bystanders near unit.
- 14. Never operate the tiller without good visibility or light.
- 15. Be careful during cleaning not to get the engine or start switch wet, as this may cause the electrical system to short circuit. If the engine or switch becomes wet, dry before use.



Maintenance and Storage

Keep machine in safe working condition. Check all fasteners at frequent intervals for proper tightness.

Never store the machine with fuel in the fuel tank inside a building where ignition sources are present such as hot water and space heaters, clothes dryers, etc. Allow the engine to cool before storing in any enclosure.

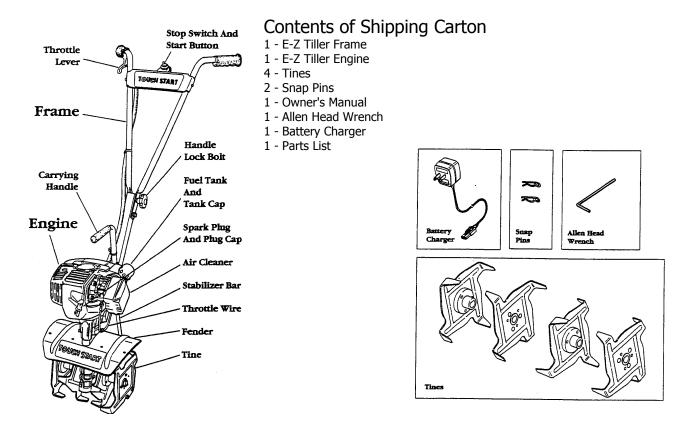
Always refer to the Owner's Manual for important details if the tiller is to be stored for any extended period.

Caring for the Starter System

- 1. Do not depress the "Start Button" while recharging the battery. This will result in damage to the battery charger. The battery charger must be disconnected from the unit before starting.
- 2. Do not attempt to charge the E-Z Tiller battery with other than the E-Z Tiller charger. Do not attempt to charge other batteries with the E-Z Tiller charger. The charger and the E-Z Tiller battery have specific voltage requirements and are designed only to work together.
- 3. The charger is designed for standard household electrical power (AC 120V). Do not attempt to use any other voltage.
- 4. Do not expose the charger to rain or snow.
- 5. Do not store the E-Z Tiller or charger where temperatures will meet or exceed 125° F (51° C) or below -25° F (-32° C).
- 6. Do not short circuit or in any way alter the charging system as this will result in damage to the battery and/or the unit.
- 7. Do not store or operate near open flames as this may cause the battery to burst and/or release toxic material.
- 8. Do not charge the battery below 32 degrees F (0 degrees C) or more than 113 degrees F (45 degrees C).

What's Inside The Shipping Carton

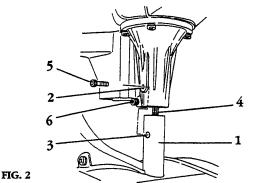
Take a minute or two to familiarize yourself with each component of the E-Z Tiller listed below. The only tool you'll need to assemble the E-Z Tiller is an allen wrench, and we've included one.

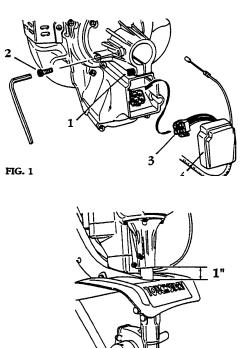


Putting It All Together 1. Mounting the Engine

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- a) (FIG. 1) Remove location bolt (2) and loosen shaft tightening bolt(1) with the allen head wrench.
- b) (FIG. 1) While holding engine over the shaft pipe, connect the electrical coupling (3) from the wiring harness to the engine.
- c) (FIG. 1) Place the dust cover (4) over the casing which holds the electrical couplings.

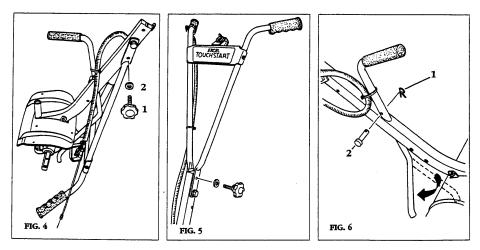




d) (FIG. 2) Slide the engine over the shaft pipe (1) and align the location bolt hole (2) in the casing with the hole (3) in the pipe. Replace and tighten the location bolt (5) and the shaft tightening bolt (6) with an allen head wrench. If the engine does not slide down far enough, rum it slightly in order to match the drive shaft splines (4) with those of the engine.

FIG. 3

NOTE: When properly installed, the engine casing should be about 1" from the top of the fender (see FIG. 3).

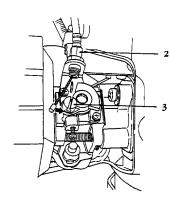


2. Handle and Stabilizer Bar Assembly

- a) (FIG. 4) Remove handle lock bolt (1) and washer (2).
- b) (FIG. 5) Extend handles to operating position. Line up lock bolt holes and install lock bolt and washer securely.
- c) (FIG. 6) Remove snap pin (1) and clevis pin (2) from the lower part of the carrying handle. Turn the stabilizer bar 180° and reinstall the clevis pin and the snap pin. There are three (3) holes in the stabilizer bar for different cutting depths. Refer to p. 9, under "Tilling and Cultivating Hints," for more details.

NOTE- The piece extending downward from the carrying handle is the stabilizer bar.

3. Connecting The Throttle Linkage



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a. (FIG. 7) Slide the throttle wire through the cable adjuster (2). Line up the "slotted" swivel (3) with the wire, making sure the hole for the wire end is opposite the cable adjuster. (See arrow.)

b. (FIG. 8) Once the throttle wire is attached to the carburetor, locate the other end of the throttle wire and insert the wire end (2) into the throttle lever hole. While pulling on the throttle wire (outer part) insert the throttle wire sleeve (1) -into the hole in the throttle lever (3).

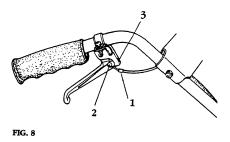


FIG. 7

4. Tine Installation/Replacement

NOTE: In this section, we refer to the E-Z Tiller's right or left side. These directions are from the operator's point of view behind the machine. All four tines are different and their positions on the shaft should not be interchanged.

Tines must be installed as shown in FIG. 9 or the unit will not function property. The two outer tines have teeth pointing in one direction only, while the teeth of the inner tines point both outward and inward. Notice that each tine has a heavy, metal hub on one side, near the center. And that each side of a tine is stamped with a letter "A", "B", "C", or "D".

a) On a level, firm surface, grasp the E-Z Tiller's handle bars and pivot them over and on the other side of the engine. Gently lower the top of the engine onto the ground. The unit is now upside down, in a handy position for installing the tines.

FIG. 9

b)

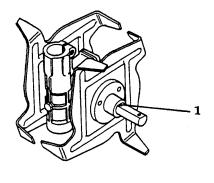


FIG. 10

- 1. (FIG. 10) Start with the left side. Select the tine that is stamped with a "B". Install the tine (on the left tine shaft) with the hub facing to the left (outward).
- 2. Next, select the tine that is stamped "A". Install this tine on the left tine shaft with the hub facing to the right (inward).
- 3. Next, select the tine that is stamped "C". Install this tine on the right tine shaft with the hub facing to the right (outward).
- 4. Then install the last tine (stamped "D") with the hub facing to the left (inward).
- (FIG. 9) Secure both sets of tines by inserting snap pins (1) through the outer sets of holes in the shaft.

NOTE. (FIG. 10) The two inner tines may be used alone for a reduced tilling width (6"), as opposed to the full 9" width with all four tines attached. To secure the two inner tines, insert the snap pins through the inner (1) set of holes in the shaft.

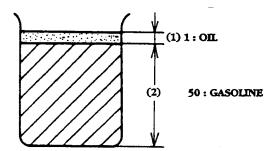


Operating Instructions

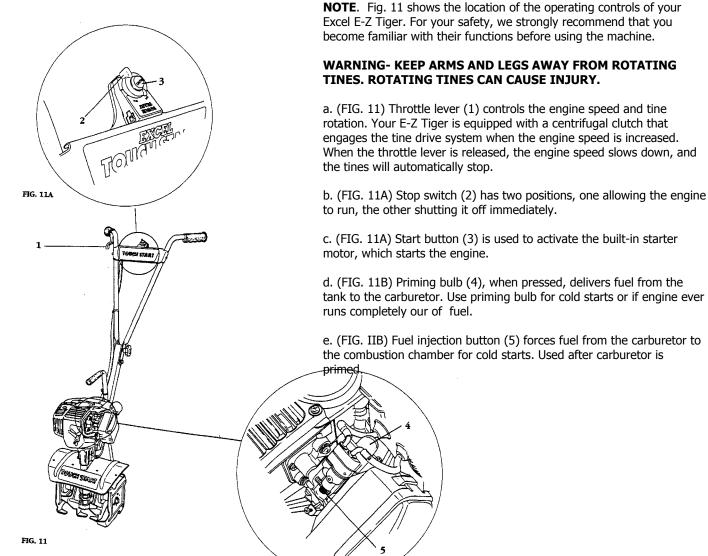
1. Fuel

Fuel for this engine requires a mix of leaded or unleaded gasoline and 2 cycle engine oil. Never operate the E-Z Tiller with unmixed or straight gasoline as it will cause rapid and permanent damage to the engine. Mix your gasoline with a high quality 2-cycle oil that is made to mix at one specific ratio of 50:1. We recommend that you select a 2 cycle oil that meets or exceeds BIA requirements.

CAUTION- Do not use gasohol or gasoline that contains alcohol. Always use fresh gasoline. Never attempt to mix the gasoline and oil in the fuel tank of the engine. Always mix your gasoline in a clean gasoline container. Once mixed, shake the container vigorously so the oil mixes with the gasoline.



2. Operating Controls



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FIG. 11B



3. Operating Procedures

Before Starting

- 1. The battery is not fully charged at the factory. It is necessary to charge it before operation. Refer to "Charging Procedures" on p. 8. Before starting the engine, be certain you (or any other operator) have read and understood the owner's manual.
- 2. Fill the fuel tank (to 1/4" to 1/2" inch below bottom of fill neck) with freshly mixed fuel. Replace tank cap. Never use fuel mix that may be stale from long periods of storage.

NOTE: The engine will only start when the "stop switch" is in the "on" position.

Cold Starting

(FIG. 11 B) Depress the priming bulb (4) several times until the fuel flows through the bulb into the carburetor. Depress the fuel injection button (5) **ONCE**, which transfers the fuel from the carburetor to the combustion chamber. Turn the stop switch (2) to the "on position" and press the "start button" (3).

CAUTION: Do not depress the start button for more than 10 seconds continuously, as this will cause premature power drainage of the batteries. Warm the engine by running at idle speed for 2 to 3 minutes.

Warm Starting

(FIG. 11) When the engine is warmed up, it is not necessary to depress the priming bulb and fuel injection button. Doing this would cause the engine to flood and make starting difficult. The correct procedure is to simply rotate the stop switch (2) to the "on position" and press the "start button" (3).

If The Engine Does Not Start

- 1. If the engine starts but does not continue to run, repeat steps under Cold Starting.
 - 2. If the engine cranks but does not fire, squeeze the throttle lever and repeat steps under Warm Starting.

CAUTION! With the throttle lever depressed, the engine will run at a high enough RPM to turn the tines. This could propel the unit forward. In this case, tilt the unit back onto the stabilizer bar in order to raise the tines off the ground!

- 3. If the starter does not make any noise when the button is pushed, either the stop switch isn't in the "on" position or the batteries need to be charged. Repeat charging steps on p. 8.
- 4. If your Excel E-Z Tiller is equipped with the optional recoil starter, follow the same steps as above except pull the recoil starter handle briskly instead of pressing the start button.
- 5. NOTE: When the engine stalls from lack of fuel, repeat the "Cold Starting" procedures.

Stopping The Engine

(FIG. 11 & 11A) Decrease the engine speed by releasing the throttle lever (1), then turn the stop switch (2) to the "OFF" position.



4. Using E-Z Tiller For The First Time

- a) With a firm grip on the handles, squeeze the throttle lever against the hand grip. As the tines make contact with the ground, hold the unit back so that the tines begin to dig. If the tilling depth is not correct (too high or too low) the stabilizer bar may be adjusted as follows:
- b) Move the STOP switch to the OFF position and remove the spark plug cap. CAUTION: Never make any adjustments to the stabilizer bar, engine, or tines while the engine is running.
- c) Remove the snap pin and clevis pin securing the stabilizer bar (see FIG. 9). Adjust the stabilizer bar up or down according to the desired depth. NOTE: Move the stabilizer bar up for a more shallow cut or downward for a deeper cut. Reinstall the clevis pin and secure with the snap pin.
- d) Start the engine and recheck the depth.

If the depth is still unsuitable, repeat the above steps.

5. Tilling And Cultivating Hints

- Tilling is digging into, turning over, and breaking up hard-packed soil before planting. Cultivating is loosening the top layer of soil, to kill weeds, aerate soil or mix in fertilizer. Loose soil is always preferable to hardpan, because it allows better root growth by letting water and air reach the root systems. Both tilling and cultivating also bring unwanted materials (such as stones and sticks) to the surface, where they're easily removed. At the same time, it enriches sod by chopping up vegetation such as old roots and weeds.
- The E-Z Tiller's stabilizer bar (located behind the tines) serves two purposes. First, it helps regulate the depth of the cut to a
 uniform level. It also acts as a brake which helps you control the speed of the unit. Lowering the depth of the bar will slow
 the tiner down, allowing you to dig deeper (tilling). Raising the stabilizer bar will allow you to make a faster, shallower cut
 (cultivating).
- When using your E-Z Tiller for weeding, it is best to till no deeper than 1 ½". Deeper tilling will only bring unwanted weed seeds to the surface. For this application you may want to raise the stabilizer bar all the way up or remove it. This will allow a faster, shallower cut. When cultivating in tight quarters, for instance between rows of vegetables, you may want to remove the outside tines (see p. 7). This reduces the tilling width from 9" to 6".
- The operator can control the tilling depth by holding back the E-Z Tiller (if the stabilizer bar is not used or the unit is not held, it will "walk" across the surface).

Charging The Battery

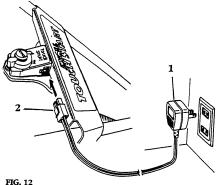
The E-Z Tiller has a built-in magneto that charges the battery as the engine runs. However, if the E-Z Tiller isn't used for a long time the battery may require charging.

(FIG. 12) Plug the battery charger (1) into a household electrical outlet (120V Only) and connect the electrical coupling (2) to the coupling on the stop switch body.

CAUTION:

- 1. Do not leave the charger plugged in for more than 24 hours.
- 2. Do not charge battery when the temperature is below 32 ° F (0° C) or above 113° F (45° C). In extreme temperatures, the battery may not accept a full charge.

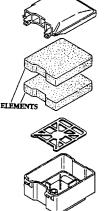
NOTE: When completely discharged, the battery will take approximately 15 hours to charge.





AIR CLEANER

Maintenance



1. (FIG. 13) Air Cleaner – The air cleaner elements must be removed and cleaned every twenty-five hours or at the beginning of each season. More frequent cleaning is recommended under very dusty conditions. Thoroughly wash the elements in liquid detergent and water. Press the elements in a rag until they are completely dry, saturate them in 2-cycle oil or the equivalent. Squeeze the elements to distribute the oil and to remove any excess oil. Replace elements and install cover.

2. (FIG. 14) Spark Plug - Clean and re-gap the spark plug after every twenty-five hours of operation. Before removing plug clean around plug base to prevent foreign material from entering the cylinder when the plug is removed. Set spark plug gap at .023 in. or 0.6mm.

3. (FIGS. 15 & 16) Muffler/Exhaust Port/Cylinder - At the end of each season (or after 25 hours of use) the muffler must be removed and cleaned to prevent carbon accumulation. At the same time, the exhaust port should be cleaned. After removing the muffler, crank the engine over until the piston completely covers the exhaust port. This will prevent any foreign material from entering the engine. Now clean the exhaust port using a wood scraper only (FIG. 16). At the same time, the cylinder cooling fins should be inspected and cleaned. If debris is collected in the cooling fins, the engine will run hot and this could result in serious engine damage. Use a wood scraper for cleaning the cylinder cooling fins (FIG. 15).

SPARK PLUG

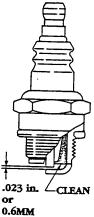


FIG. 14

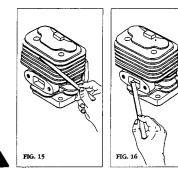
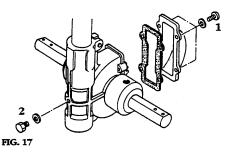


FIG. 13

4. (FIG. 17) Tine Shaft/Gear Case - The tine shaft should be thoroughly cleaned and oiled with a multi-purpose oil after every twenty-five hours of operation. The tine shaft should also be lubricated prior to storage. Every 25 hours and/or at the beginning of each season, the gear case should be filled with grease. Remove the gear case cover by removing four screws (1) and the bolt (2). Fill the gear case with a lithium based multipurpose grease. Insert grease rube nipple into bolt hole of gear case. Squeeze tube until grease is level with the gear case gasket surface. Reinstall gear case cover with gasket and tighten bolts securely. Reinstall bolt with gasket and tighten securely.



CAUTION: Before making any inspections or repairs recommended in this manual, first make sure the "stop" switch is in the off position and the spark plug cap is removed. These steps will prevent accidental starting which could result in injury.

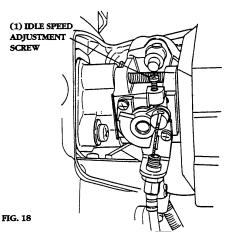
5. General Maintenance Items - Good preventative maintenance habits will prolong the life of your E-Z Tiller. We recommend the following checks after each use: check screws, nuts, and bolts for tightness; check fuel lines and connections for leaks; inspect and clean fender, tines, and the gear case. (Note: When cleaning, avoid splashing water on the engine and stop switch.)

6. Tine Replacement - If rocks or other debris become lodged in tines, immediately stop the engine and clean. **CAUTION**: Before cleaning, make sure the stop switch is in the off position and the spark plug cap is removed. This will prevent accidental starting. **DANGER**- Tines are self-sharpening and will become quite sharp. Handle carefully. Tines will wear fairly evenly. If tines are being replaced because of wear, we recommend that all four tines are replaced at the same time. Refer to p. 7 for installation procedure.

7. (FIG. 18) Carburetor Idle Adjustment - The carburetor has been pre-adjusted at the factory and normally will not require further adjustment If the engine does not run smoothly at idle speed, first clean the air cleaner element, fuel filter and check fuel lines. If they are okay, adjust the carburetor as follows.

- a) Start the engine and allow it to warm up for five minutes.
- b) Turn the idle speed adjustment screw (1) clockwise or counterclockwise (clockwise increases engine speed, counterclockwise decreases engine speed) to achieve the correct idling speed. NOTE: If the engine speed is too high, the tines will rotate. If the engine speed is too low, the engine will stall.

NOTE: A stiff throttle wire may cause high idling speed. Oil/spray the wire when needed. If the wire is still stiff, it may need to be replaced.





Storage

DANGER: Never store the E-Z Tiller indoors with fuel in the tank. Gas fumes could be ignited by an open flame or pilot light, such as on a furnace, water heater, or clothes dryer. Handle gasoline carefully. It is highly flammable and careless handling could result in serious fire damage to persons and/or property. Always drain fuel outdoors, away from open flames, into an approved container.

- 1. It's a good idea to perform the following storage procedures at the end of the season or if your E-Z Tiller won't be used for more than thirty days:
- 2. Remove all fuel from the fuel tank to prevent gum deposits from forming and causing possible malfunction of the engine. Drain fuel into an approved fuel container.
- 3. Start and run engine until it stops due to lack of gasoline.
- 4. Clean unit thoroughly, removing all dirt and debris from the engine, tines and gear case.
- 5. Remove tines and oil tine shaft Reinstall tines. (Refer to p. 5 for procedures).
- 6. Remove clevis pin and snap pin, then turn stabilizer bar 180 degrees for storage. Remove handle lock bolt. Carefully fold handles downward into storage position. Reinstall handle lock bolt (Refer to P. 4 for procedures). NOTE: To give you more space in your garage or shed, the E-Z Tiller can be hung on a wall from the top of its rectangular tubing.
- 7. Store your E-Z Tiller in a protected area for additional protection. **CAUTION**: Do not store your E-Z Tiller or battery charger where temperatures could get below 25 degrees F (-32 degrees C) or above 125 degrees F (52 degrees C).

Displacement	1.1 HP @ 8500 RPM (21cc/1-3 cu. in.)		
Starter System	Automatic - Electric (push button)		
Ignition System	Electronic		
Carburetion System	Diaphragm w/primer and fuel injection start		
Clutch System	Centrifugal		
Drive System	Worm Gear (49:1 reduction)		
Tine Width	Adjustable 6" or 9"		
Tine Diameter	8 1/2"		
Cultivating Depth	8″		
Dry Weight	22 lbs / 10.0 kg		
Fuel Tank Capacity	23.7 fl. oz. / 700 cc		
Battery Pack	4.8V DC rechargeable		
Charging System	Internal (ignition coil) also AC/120V unit (back-up)		
Air Cleaner	Oiled Foam Elements (2)		
Handle	2-piece folding		
Stabilizer Bar	Standard		
Carrying Handle	Standard		

Specifications

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Trouble Shooting

Engine Won't Start		
a. Engine does not turn over	Battery is low→Switch not on→Incorrect wiring→	Recharge Battery (see pg 8) Check Start Switch Check electrical coupling connection (see page 4)
b. Engine turns over	Incorrect Starting ProcedureNo spark on spark plugNot enough fuelFuel is old or incorrectDirt in fuel tank	See Page 7 Clean and re-gap plug (see pg 9) or replace Add fuel Replace with fresh fuel (see pg 6) Clean fuel tank
Engine Lost Power	Carbon on muffler → Too much oil in fuel → Plugged air filter → Throttle is not open →	Clean (see pg 9) Replace with proper fuel Clean (see pg 9) Squeeze the throttle lever
Tines Won't Turn	Incorrect Engine Installation → Foreign object lodged in tines → Engine speed too slow →	Reinstall engine (see pg 4) Clean Tines See above (Engine Lost Power section.)
Tines Rotate when throttle is released	Carburetor out of adjustment → Stiff throttle wire →	Adjust idle speed (see pg 9) Spray / oil throttle wire
Unit does not till properl	Y Incorrect tine installation Incorrect stabilizer bar installation	 → Reinstall tines (see pg 5) → Adjust depth (see pg 8)
Engine does not idle	Carburetor out of adjustment	→ Adjust carburetor (see pg 9)